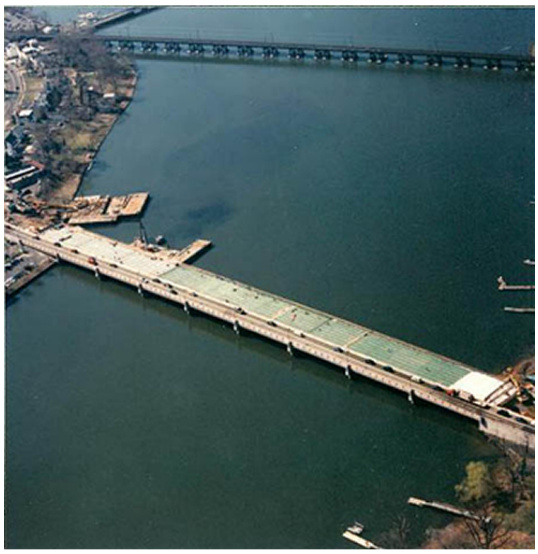
8th Annual NJDOT Research Showcase

27th October 2006
The College of New Jersey
Ewing, NJ



Hosted by
New Jersey
LTAP
Rutgers University

PROGRAM

8th Annual NJDOT Research Showcase
Schedule

9:15 – 9:45 a.m. Opening Remarks Session ~ Room 202

- Camille Crichton-Sumners
  Manager, Bureau of Research and Demonstration
  New Jersey Department of Transportation

- Welcome to The College of New Jersey

- Russell Jorgenson
  Assistant Division Administrator
  Federal Highway Administration, NJ Division

- Brent Barnes
  Director, Systems Planning and Research
  New Jersey Department of Transportation

- Congressman Bill Pascrell
  Congressional District 8
  Member, Transportation and Infrastructure Committee

- Senator Nicholas J. Sacco
  Legislative District 32
  Chairman, Senate Transportation Committee

- Assemblyman John S. Wisniewski
  Legislative District 19
  Chairman, Assembly Transportation Committee

- Dr. Robert Paaswell
  Director and Distinguished Professor of Civil Engineering
  University Transportation Research Center

- Dr. Lazar Spasovic
  Director, National Center for Transportation and Industrial Productivity
  New Jersey Institute of Technology

- Jon Carnegie
  Assistant Director, Alan M. Voorhees Transportation Center
  Rutgers University

- Dr. Trefor Williams
  Professor, Center for Advanced Infrastructure and Transportation
  Rutgers University

- Dr. William Riddell
  Assistant Professor of Civil and Environmental Engineering
  Rowan University

9:45-11:30 a.m. Plenary Session ~ Room 202

	Presentation Title	Presentation Speaker
1	2005 DARPA Grand Challenge	Dr. Alain Kornhauser, Princeton University
2	Bridge Approach and Transition Slab Design	Dr. Hani Nassif, Rutgers University
3	Digital Highway Vehicle System	Dr. Kunik Lee, Federal Highway Administration

Distinguished Plenary Speaker NJDOT Commissioner Kris Kolluri

Critical Issues in Transportation

Kris Kolluri was sworn into office as Commissioner of the New Jersey Department of Transportation (NJDOT) on March 13, 2006. Prior to that, Kolluri specialized in redevelopment and transportation law as an attorney at Parker McCay of Marlton.

Kolluri was Chief of Staff to New Jersey Transportation Commissioner Jack Lettiere. In this capacity, he served as counselor to the Commissioner and managed the development and implementation of the department's legislative and regulatory policies and communications strategies.

Before he worked for Congressman Gephardt, Kolluri served as Congressman Robert E. Andrews' Legislative Director and his principal staffer on the International Relations Subcommittee on Asia and the Pacific.

Kolluri received a Bachelor of Science degree in Management and Marketing from Rutgers University, a Masters degree in International Business from Johns Hopkins University and a law degree from Georgetown University.

2005 DARPA Grand Challenge

The Defense Advanced Research Projects Agency (DARPA) is the central research and development organization for the Department of Defense (DoD). DARPA's mission is to leverage ingenuity and research to develop transformational technologies that give our armed forces a decisive edge. The DARPA Grand Challenge was created in response to a Congressional and Department of Defense mandate, DARPA Grand Challenge is a field test intended to accelerate research and development in autonomous ground vehicles that will help save American lives on the battlefield. The Grand Challenge brings together individuals and organizations from industry, the R&D community, government, the armed services, academia, students, backyard inventors, and automotive enthusiasts in the pursuit of a technological challenge. Presented will be an overview of the design and accomplishments of Prospect Eleven, Princeton University's entry in the 2005 DARPA Grand Challenge. Prospect Eleven was notable as the only entry to qualify for the Grand Challenge for which all modifications to a stock vehicle were designed and built entirely by undergraduates, most of whom were underclassmen. It was also the only entry that relied entirely on stereo vision for obstacle detection.

Presented by Dr. Alain Kornhauser: Dr. Alain Kornhauser has been a Professor for more than thirty years. His full-time occupation is Professor of Operations Research and Financial Engineering at Princeton University, where he is also Director of the Interdepartmental Transportation Research Program, Co-Director of the Center for Transportation Information and Decision Engineering and an affiliated faculty member of the Woodrow Wilson School of Public and International Affairs. Dr. Kornhauser received his Ph.D. in Aerospace and Mechanical Engineering from Princeton University in 1971 and a BS and MS in Aerospace Engineering from Penn State University. He is a member of many professional societies, has been published extensively in scholarly journals, and has made numerous presentations at professional conferences around the world. He is a co-founder and board chair of ALK Technologies, Inc. Dr. Kornhauser has devoted his entire professional career trying to find better ways of getting people and things from A to B.

Bridge Approach and Transition Slab Design

Bridge approach slabs are designed to function as a transitional roadway to the bridge deck spanning the distance between the abutment and road pavement. However, the number of rough-riding as well as cracked approaches with heavy maintenance requirements is sufficient to convince highway agencies that a serious problem exists. The complaints usually describe a "bump" that motorists feel when they approach or leave bridges. This bump results in reduction of steering response, distraction to the driver, amplified truck impact and dynamic response in bridge decks, and expense to maintenance operations. Approach slabs can lose their contact supports due to various reasons, including the settlement of soil and bulging of embankments.

Results from this study were used to evaluate the analytical behavior, as well as the field performance of new design alternatives that could reduce or eliminate cracking, are presented. The new design alternatives were analyzed using comprehensive finite element models and were also built and instrumented at the Doremus Avenue Bridge in Newark, New Jersey, for testing and long term monitoring. Various truck load tests were performed prior to opening the bridge to traffic. The results show that the FE models are accurate and that the new design alternatives have higher load carrying capacities than that of the existing design. Moreover, results show that long-term field monitoring using various sensors provided a quantitative measure of various factors that causes cracking of the approach slabs. Research outcome provided the basis for implementing the final design detail on various projects under contract by the NJDOT.

Presented by Dr. Hani Nassif: Professor Hani Nassif is currently an Associate Professor in the Department of Civil and Environmental Engineering at Rutgers University. He obtained his B.S. and M.E. in Civil Engineering from The University of Detroit and his Ph.D. in Structural Engineering from the University of Michigan at Ann Arbor. Prior to that, he has taught at Villanova University, Pennsylvania, and Bradley University, Peoria, Illinois, and worked on the pioneering work for the calibration and development of the new LRFD AASHTO Code for Bridges (NCHRP Project 12-33) and for the calculation of load and resistance factors for Ontario Highway Bridge Design Code (OHBDC, 1990). He has developed models of static and dynamic live load for girder bridges based on field-testing and truck weigh-in-motion (WIM) data. Dr. Nassif has several years of practical experience and is currently serving as the Secretary of TRB Committee (AFFN40) on the dynamic and field-testing of bridges. He is the Chairman of ASCE Committee on Safety of Bridges and Design Subcommittee of ACI 343-Concrete Bridges. He is a Fellow and member of the American Concrete Institute's Technical Activities Committee (TAC) and the past Chairman of both, ACI Committee 348 - Structural Safety and Design Subcommittee of ACI 343-Concrete Bridges. In 2006, Prof. Nassif was awarded the Educator of Year Award by the American Council of Engineering Companies (ACEC) and by the ASCE's Central New Jersey Branch in 2003.

Digital Highway Vehicle System

The Federal Highway Administration developed a prototype Digital Highway Measurement System at the Turner-Fairbank Highway Research Center. The project was initiated in 2003 on the contract DTFH 61-00-C-00076. The primary objective of the research project was to combine the pavement surface and cross-slope system technologies with a scanning laser, digital cameras, and National Differential GPS antennas on a single vehicle to measure in-situ conditions of roads. The potential for measuring the geometry of the road from HA-NDGPS data was investigated. In 2004, an initial effort on a ground penetrating radar component was initiated to acquire information below the surface of the roadway simultaneously with the core information on geometry and pavement surface. Finally, the prototype DHM system was built and was ready for initial data collection in 2004. Data was collected on six primary sites in 2004 and 2005. The long-range objective for the DHM van is to improve the quality, cost-effectiveness, and quantity of roadway and roadside engineering data for both design and analysis processes within a state or local highway department or for Federal agencies.

Presented by Dr. Kunik Lee: Dr. Lee is the Chief Safety Scientist at Turner-Fairbank Highway Research Center (TFHRC), Federal Highway Administration (FHWA), a position held since January 2006. In this position, his primary responsibilities are: develop the concept of integrated safety system; manage advanced research initiatives; develop a research quality improvement plan and participate on the TFHRC quality initiatives; develop the plans with university transportation center (UTC) on highway safety; manage intelligent transportation system (ITS) initiatives; and further development and application of the digital highway measurement (DHM) system. Prior to Dr. Lee's FHWA appointment, he has worked for auto industry since 1975 as a special program manager in the areas of product planning, marketing strategy, engineering, manufacturing and assembly process, and development and application of latest technology. Dr. Lee earned a B.S. in Mechanical Engineering from Hanyang University in Seoul, Korea and a M.S. and Ph.D. in Mechanical Engineering from Wayne State University in Detroit, Michigan. He also completed a GM Overseas Fellowship Program at General Motors Institute in Flint, Michigan, majoring in Mechanical Engineering.

11:30-11:40 a.m. Outstanding University Student in Transportation Research Awards

To be presented by Camille Crichton-Sumners:

Mr. Alexander S. Barron, Alan M. Voorhees Transportation Center

Alexander Barron is a straight-A student who has been at or near the top of every transportation class he has taken in the master's degree program in city and regional planning at Rutgers, and he has taken them all. Alex has also worked for the past two school years as a graduate assistant at the National Transit Institute. During this time, he has researched information related to NTI's workplace safety and security initiatives.

Mr. Stephen Price, Rowan University

Stephen Price received a B.S. in Applied Physics from Richard Stockton University. He completed his M.S. in Engineering at Rowan University in 2006 with a concentration in Civil Engineering, and is currently pursuing a Ph.D. at Purdue University.

Mr. Matthew Bryant, Center for Advanced Infrastructure and Transportation

Mr. Bryant attended Rutgers University as an undergraduate and graduated in May, 2005 at the top his Civil Engineering class. Not only is he a full-time student constantly studying and working hard to succeed academically, his work as a graduate assistant in the Rutgers Asphalt Pavement Laboratory conducting research in the area of asphalt concrete pavements and transportation infrastructure design helps in contributing to advances in the field of asphalt technology.

Ms. Kanchana Malini Balakrishnan, New Jersey Institute of Technology

Malini is a Ph.D. candidate at the Interdisciplinary Program in Transportation at the New Jersey Institute of Technology. Most recently Malini has worked on two important projects: "Development of a Simulation and Prototype Data Warehouse Model for Evaluating Intelligent Transportation Systems (ITS) Projects", and "Development of a Route Design Model for Greyhound Bus Lines."

Mr. Sandeep Mudigonda, University Transportation Research Center

Sandeep received his undergraduate degree in CEE from IIT Madras in India which is the top Civil Engineering program in India. He joined Rutgers University in 2003 and received his MS degree in the Fall of 2006 and is currently a first year Ph.D. Student in the CEE program at Rutgers University.

11:40-12:00 p.m. **Poster Session and Networking ~ Lounge Area**
Please visit the various vehicles outside in the courtyard area adjacent to Brower Student Center.
For information on the TCNJ vehicles, please visit:
http://www.tcnj.edu/~engsci/student_projects.htm

12:00-1:00 p.m. **Luncheon ~ Room 202**

1:00-3:30 p.m. **Breakout Panel Sessions**

Intelligent Transportation Systems/Congestion ~ Room 210

Safety/Human Factors ~ Room 211

Infrastructure ~ Room 202

ITS-Congestion Mitigation
Moderator: Robert Sasor

1:00 to 3:30 PM ~ Room 210

	Presentation Title	Presentation Speaker
1	The Impact of a Virtual Container Yard (VCY) on State Highway Network: Operational and Modeling Issues	Dr. Sotiris Theofanis (Presenter), Dr. Maria Boile, and S. Janakiraman, Center for Advanced Infrastructure and Transportation/University Transportation Research Center
2	Traffic Mobility and Real-Time Congestion Management: a Case Study for Lower Manhattan	Dr. John Falcocchio (Presenter) and Dr. Ali Afshar, Urban ITS Center Polytechnic University/University Transportation Research Center
3	Microscopic Traffic Simulation of Construction Staging on NJ 139	Dr. Keir Opie, New Jersey Institute of Technology
4	A New Methodology for the Optimal Placement of Traffic Sensors	Dr. Kaan Ozbay and Bekir Bartin (Presenter), Center for Advanced Infrastructure and Transportation
5	Bus Network Design Model-Case Study of a Major Bus Operator	Branislav Dimitrijevic, New Jersey Institute of Technology
6	Traffic Simulation Model for Evaluation of the Cape May Evacuation Plan	Dr. Keir Opie, New Jersey Institute of Technology

The Impact of a Virtual Container Yard (VCY) on State Highway Network: Operational and Modeling Issues

The tremendous increase in international trade has given rise to the problem of considerable amount of inefficient empty truck trips to and from the ports in coastal megacity areas such as the NY-NJ region, resulting in unproductive vehicle miles traveled (VMT), congestion and other related consequences. Using a Virtual Container Yard (VCY) system-an Internet based platform for sharing and providing information among parties involved to make freight logistics more efficient by means of direct empty container interchange (street-turns)- is increasingly considered as a viable solution. This presentation draws on the results of a recent study on investigating the feasibility of establishing a VCY in the NY-NJ Region to discuss the operational patterns of potential users of the system, a modeling approach to quantify benefits in terms of VMT reduction and the potential impact on the State Highway Network.

Presented by Dr. Sotiris Theofanis: Professor Sotirios Theofanis is Visiting Professor and Director of Program Development, Maritime Infrastructure Engineering and Management Program (MIEMP) at Rutgers University's Center for Advanced Infrastructure and Transportation (CAIT), Fellow of the Supply Chain Management Center, Rutgers University Business School and Advisor to the Board for supply chain management, corporate governance and investor relations of LOULIS Group, a major Industrial Group of Companies in South-eastern Europe, active in the fields of Flour Mills and Food Processing, with industrial and commercial activities in Greece, Bulgaria, Romania and Albania. He is former Senior Executive Vice President and Chief Executive Officer of LOULIS Group, former President and CEO of Piraeus Port Authority, S.A., Greece and former CEO of Thessaloniki Port Authority, S.A., Greece. He is also former Director for Port Planning of the Hellenic Ministry of Merchant Marine.

Traffic Mobility and Real-Time Congestion Management: a Case Study for Lower Manhattan

The purpose of this paper is to propose a framework for a pro-active, "real time" traffic congestion management. Using Lower Manhattan as a case study, it will be shown that network traffic speed in is determined by the number of vehicles in the traffic network (vehicle accumulation) at that time. Real time monitoring of traffic entering and leaving the road network by the Traffic Management Center (TMC) will make it possible to monitor the area's vehicle accumulation, which is the key factor in determining traffic speed, and hence traffic mobility (measured in vehicles-miles per hour). By controlling vehicle accumulation through readily available traffic supply and demand strategies, it will be possible to achieve traffic speed levels that will maximize traffic mobility at any time of the day.

Presented by Dr. John Falcocchio: John Falcocchio is Co-Principal Investigator for Polytechnic University at ICIS, and is Professor of Transportation Planning and Director of the Urban Intelligent Transportation Systems (ITS) Center at Polytechnic University in New York, where he has been a member of the faculty for 22 years. Dr. Falcocchio's expertise in the area of transportation includes traffic and transportation studies, transportation systems analysis, travel demand and transportation system management, traffic congestion and air pollution reduction strategies, coordination of land use and transportation, and intelligent transportation systems. Dr. Falcocchio is an author and co-author of many technical papers and one book. Education: B.C.E., Polytechnic Institute of Brooklyn; Traffic Engineer Certificate, Bureau of Highway Traffic, Yale University; M.S., Transportation Planning, Polytechnic Institute of Brooklyn; and Ph.D., Transportation Planning, Polytechnic Institute of Brooklyn.

Microscopic Traffic Simulation of Construction Staging on NJ 139

The project expands on the Portway Simulation work by the International Intermodal Transportation Center (IITC) at NJIT by shifting the study area coverage further east along the Route 139 Corridor to the Jersey City Waterfront. The study models all roadways surrounding the New Jersey side of the Holland Tunnel portal, including the NJ 139 upper roadway, NJ 139 lower (covered) roadway, the NJ Turnpike extension, and local roadways in Jersey City. The model also simulates the behavior at the Holland Tunnel toll booths. The project uses advance traffic simulation software (Paramics) to estimate the impacts on drivers of the construction activities. Lane closures and capacity losses due to narrowed lanes, eliminated shoulders, and surrounding construction activities are explicitly analyzed in the simulation model to determine the impacts. The use of Paramics also allows for the delineation of impacts between Holland Tunnel users and local Jersey City traffic.

Presented by Dr. Keir Opie: Dr. Opie is a Manager of Simulation and Modeling for the IITC. He holds a B.A.Sc in Civil Engineering from the University of Waterloo in Waterloo, Ontario, Canada. Mr. Opie has five years of experience in Transportation Planning, Transportation Modelling, Traffic Simulation and Analysis, and Traffic Operations. Mr. Opie brings three years of consulting engineering experience in New Jersey and the New York City area in regional demand models, air quality analysis, traffic simulation projects, and traffic impact studies. Mr. Opie is also a recognized Advanced Paramics Trainer by Paramics's parent software company, Quadstone.

A New Methodology for the Optimal Placement of Traffic Sensors

This project, *A Clustering Based Methodology for Determining the OptimalRoadway Configuration of Detectors for Travel Time Estimation,* deals with the problem of finding the optimal roadway segment configuration for road-based surveillance technologies to estimate route travel times accurately. This problem is inherently a space discretization problem regardless of which travel time estimation function is used. The ad-hoc solution to this problem is the equidistant segment configuration, such as every half-mile, every one-mile. It is shown in our study that the space discretization problem can be expressed as the common clustering problem. The novelty of the proposed approach is the use of preliminary probe vehicle trajectory data to obtain statistically significant traffic regime at the study route. Clustering of sample space-time trajectory data is proposed as a viable methodology for solving the optimal roadway segment configuration problem.

Presented by Bekir Bartin: Bekir is a Research Associate in Civil and Environmental Engineering Department at Rutgers University. He received his B.S. in Civil Engineering in 1997 from Middle East Technical University, Ankara, Turkey, and his M.S. in 2000 in Civil Engineering (Transportation) from Rutgers University. He is currently pursuing his Ph.D. degree at Rutgers University. Mr. Bartin has been conducting research and publishing in the area of transportation engineering for the last 8 years. Mr. Bartin’s research interest in transportation covers traffic simulation and modeling, incident management, economic evaluation of transportation projects, and collection and statistical analysis of traffic data.

Bus Network Design Model-Case Study of a Major Bus Operator

The objective of the Bus Route Design Model is to determine passenger flows and required number of buses to serve passenger demand for a major intercity bus operator. The optimization model maximizes total profit, while satisfying set of constraints including flow conservation, demand constraints and station service constraints. Profit in this case is defined as the total revenue less the sum of bus fixed and operating costs, and station maintenance costs. The stated objective can be achieved by retaining necessary sales locations, maintaining economic number of buses, optimizing link-based bus frequencies, as well as link-based customer volumes for all OD-pairs. While mathematical model is straight-forward, the solution is not easily generated for a very large network (considering number of stations, links, and OD pairs). In this presentation we will discuss calculation complexities associated with a large-scale model and methods that can potentially improve the model performance and yield satisfactory solution.

Presented by Branislav Dimitrijevic: Mr. Dimitrijevic holds a position of the Senior Transportation Engineer with the International Intermodal Transportation Center (IITC) at New Jersey Institute of Technology (NJIT). His expertise is in the areas of network optimization, multimodal freight transportation, and transportation systems analysis. Mr. Dimitrijevic has been working on several projects dealing with evaluation of traffic congestion and safety, transit network optimization models, analysis of freight movements, and integrated transportation and land use planning models. Mr. Dimitrijevic holds an M.S. degree in Transportation from the New Jersey Institute of Technology, and a Diploma in Transportation Engineering from Belgrade University, Serbia.

Traffic Simulation Model for Evaluation of the Cape May Evacuation Plan

This study determined the evacuation times under varying population, behavioral response, hurricane levels, and Routes 47/347 reversal lane operation scenarios for Cape May County, New Jersey. Roadway elevations throughout the Routes 47/347 Corridor study area were established via a GPS survey to verify whether the roadways are usable in the event of a hurricane. Results of the study show that the current State Police reversal plan is ineffective due to the limited time savings. The reversal plan needs to be revised as the bottleneck during evacuation would exist south of Route 83, the initiation point of the current reversal plan.

Presented by Dr. Keir Opie: Dr. Opie is a Manager of Simulation and Modeling for the IITC. He holds a B.A.Sc in Civil Engineering from the University of Waterloo in Waterloo, Ontario, Canada. Mr. Opie has five years of experience in Transportation Planning, Transportation Modelling, Traffic Simulation and Analysis, and Traffic Operations. Mr. Opie brings three years of consulting engineering experience in New Jersey and the New York City area in regional demand models, air quality analysis, traffic simulation projects, and traffic impact studies. Mr. Opie is also a recognized Advanced Paramics Trainer by Paramics's parent software company, Quadstone.

Safety/Human Factors
Moderator: Ed Kondrath

1:00 to 3:30 PM ~ Room 211

	Presentation Title	Presentation Speaker
1	Medical Review Case Reporting	Dr. Naomi Rotter, New Jersey Institute of Technology and Dr. Claire McKnight, University Transportation Research Center
2	Prevention of Phase to Ground Faults at Grade Crossings in Electrified Territory of NJ Transit	Dr. William Riddell (Presenter), Hector Suarez, William Riddell, Peter Jansson, and Doug Cleary, Rowan University
3	Driver's License Suspensions, Impact and Fairness Study	Jon A. Carnegie, Alan M. Voorhees Transportation Center Rutgers University
4	Breakaway Utility Poles to Reduce Fatalities on the State Highway System	Dr. William Riddell (Presenter), Clay Gabler, and Doug Gebauer, Rowan University
5	Mobile Work Zone Protection Device (Balsi Beam)	Robert Baker, University Transportation Research Center

Medical Review Case Reporting

To deal with a problem of underreporting of high risk and/or unsafe drivers to its Driver Review Bureau, the Motor Vehicle Commission of New Jersey seeks to understand the state of practice in other driver licensing agencies with regard to medical review procedures and particularly both internal and external referral processes. This research, through literature review and an in-depth phone interview of heads of driver safety units, medical review units or managerial personnel in seventeen driver licensing agencies in the United States has identified a series of procedures that link to high referral rates. Typically, states with high referral rates tend to ask several specific questions regarding health at the time of initial application for license and again at renewal. These states also trained their customer service or counter personnel in observational techniques to identify applicants with potential medical problems that could make them unsafe drivers, mandatory physician reporting of specific medical conditions was another strategy that led to higher than typical referral rates. Interviewees stressed the importance of obtaining accurate information and good relationships with the medical and law enforcement communities. Another area that appears useful for increasing referrals is better integration of accident reporting information and medical review units. These findings will form the basis of recommendations to the New Jersey Motor Vehicle Commission for more pro-active policies in obtaining both internal and external referrals.

Presented by Dr. Naomi Rotter and Dr. Claire McKnight: Dr. Naomi G. Rotter is a Professor of Management in NJIT's School of Management. She received her Ph.D. in Industrial and Organizational Psychology from New York University. Previous research, The Mature Driver: Safety and Mobility Issues, blended her research interests in social issues of gerontology with behavioral aspects of safety. Dr. Rotter's research in transportation has focused on its behavioral aspects from a variety of perspectives. These include training needs in transportation, managerial issues in telecommuting and the current research on safety issues regarding mature drivers.

Dr. Claire E. McKnight is an Associate Professor of Civil Engineering at City College of New York. She has a Ph.D. in Public Policy Analysis from the University of Illinois Chicago. Her research experience is in transportation policy and planning, including public transit operations and transportation for special groups. Previous traffic safety related research include: The Mature Driver: Safety and Mobility Issues and Evaluation of Graduated Driver Licensing In New Jersey, both done for NJ MVC.

Prevention of Phase to Ground Faults at Grade Crossings in Electrified Territory of NJ Transit

New Jersey Transit has had several instances where railroad crossing gates have made contact with high-voltage catenary lines that supply electric power to trains, high-voltage lines that provide power to signals, or have become ensnarled with static lines associated with train service. A study has been performed to identify at-risk sites, and to suggest strategies for preventing these events from occurring. The criteria for identifying at-risk sites will be discussed. An analysis of various solution strategies will be presented. Finally, a suite of solution strategies are discussed, as well as a process for identifying site-specific solutions.

Presented by Dr. William Riddell: Dr. Riddell is an Assistant Professor of Civil and Environmental Engineering at Rowan University. Prior to that, he was an Engineer for the John A. Volpe National Transportation Systems Center in Cambridge, MA, and a National Research Council Postdoctoral Fellow in residence at NASA Langley Research Center in Hampton, VA.

Driver's License Suspensions, Impact and Fairness Study

At any given time, approximately 290,000 (or 5%) of licensed drivers in New Jersey have their driving privileges suspended for a variety of reasons, both driving and non-driving related. The impacts of license suspension, especially on low-income drivers are not well known. This study was undertaken to: 1) determine the socio-economic impacts of driver's license suspension and 2) to investigate possible methods for reducing or eliminating the negative or unintended impacts of driver's license suspensions. This study involved a detailed statistical analysis of Motor Vehicle Commission driver history data; a survey of suspended drivers; and outreach to other states to document various methods used to mitigate the unintended consequences of license suspension. Outreach to other states revealed that states use a variety of programs to help mitigate suspension impacts, including flexible payment plans, fee/penalty amnesty programs and conditional or restricted use driver's licenses, which are available in 39 states and the District of Colombia.

Presented by Jon A. Carnegie: Mr. Carnegie has 15 years of experience in the fields of land use and transportation planning and policy at the municipal, county and regional level. He is the principal investigator for a variety of research and planning projects involving a range of transportation policy topics. His experience includes managing research projects involving transit-oriented development, the relationship between land use and transportation, long-range vision planning, transportation capital finance, transportation equity, driver's licensing, workforce transportation options for low-income individuals and persons with disabilities, and senior mobility. Mr. Carnegie holds a B.A. and a Master of City and Regional Planning degree from Rutgers University.

Breakaway Utility Poles to Reduce Fatalities on the State Highway System

An ongoing project for New Jersey Department of Transportation has the goal of reducing fatalities involving utility poles. This presentation will focus on two aspects of the project: cost-benefit and feasibility analysis of several strategies, including breakaway and energy absorbing poles, as well as site investigations of several sections of highway that have histories of frequent and severe accidents involving utility poles.

Presented by Dr. William Riddell: Dr. Riddell is an Assistant Professor of Civil and Environmental Engineering at Rowan University. Prior to that, he was an Engineer for the John A. Volpe National Transportation Systems Center in Cambridge, MA, and a National Research Council Postdoctoral Fellow in residence at NASA Langley Research Center in Hampton, VA.

Mobile Work Zone Protection Device (Balsi Beam)

This project focuses on the fabrication and implementation of the Balsi Beam which is a truck mounted, moveable, expandable beam that provides positive work zone protection comparable to a fixed concrete barrier. It is specifically intended to enhance worker safety when carrying out shoulder repair in work zones adjacent to guardrails, inlet repair, bridge rails, bridge deck repair, sound walls and other work where workers are normally exposed to traffic or behind cones in limited work areas for several hours. Usually the shadow vehicle or the truck mounted attenuator provides protection from rear end collisions; the new device provides protection from adjacent lane traffic. The Balsi Beam provides positive, steel beam protection system for exposed workers who normally work behind temporary cones and barrels in limited work areas. The TL-3 crash test at the Texas Transportation Institute shows that the beam does not deflect as conventional unpinned portable concrete median barrier in such crashes. The Balsi Beam is practically applicable to bridge and concrete repair projects where workers are concentrated in small areas over a one day period or less.

Presented by Robert Baker: Robert Baker has a Bachelors Degree from the College of New Jersey and Masters Degree in Civil Engineering from Rutgers University. He is currently a Transportation Research Engineer with the Region 2, University Transportation Research Center at City College of New York. Robert retired from the NJDOT after 35 years with the Research and Quality Assurance Units. His expertise includes highway engineering, materials and safety research, and construction specifications and he is active in several Transportation Research Board committees, and the National Cooperative Highway Research Program advisory panels.

Infrastructure Breakout Panel Session
1:00 – 3:30 p.m. ~ Room 202

Moderator – Vincent Nichnadowicz, NJDOT

	Presentation Title	Presentation Speaker
1	Culvert Information Management System	Dr. Jay N. Meegoda (Presenter) and Dr. Thomas Juliano, New Jersey Institute of Technology
2	Evaluation of the Performance of Permanent Pavement Markings: Some Implications for NJDOT	Dr. Neville A. Parker, City University of New York University Transportation Research Center
3	Partnership to Maximize Port Industry Performance	Dr. Maria Boile (Presenter), Dr. Sotiris Theofanis, Alok Baveja, and Dr. Mohsen Jafari, Center for Advanced Infrastructure and Transportation Rutgers University
4	Energy Absorbing Bridge Pier Fender Systems: A Survey and Recommendations	Dr. Neville A. Parker, City University of New York University Transportation Research Center
5	Evaluation and Modeling of Repeated Load Test Data of Asphalt Concrete for Mechanistic-Empirical Pavement Design	Dr. Yusuf Mehta (Presenter), Leslie Myers, and Stephen Price, Rowan University
6	Flexible Overlays for Mitigating Reflective Cracking	Tom Bennert, Center for Advanced Infrastructure and Transportation Rutgers University

Culvert Information Management System

This presentation describes the first phase of research funded by New Jersey Department of Transportation (NJDOT) to develop a Culvert Information Management System (CIMS). The CIMS will serve as a vehicle for evaluating underground infrastructure assets, and facilitate computing present worth and comparing present costs of preserving them. Benefits of the CIMS will include long-term savings that should accrue from adopting optimized preventive maintenance strategies. In addition, it will help compliance with new federal storm water regulations. The CIMS developed during Phase I will inventories all the culverts in the network. Retrievable information includes location, material and other physical attributes, and condition state.

Presented by Dr. Jay Meegoda: Dr. Meegoda has been working in the civil and environmental engineering area for over 25 years. He utilizes scientific concepts and engineering technologies in his research to provide solutions to real world problems. Dr. Meegoda has worked with state and local governments, and foreign governments to provide technical input for broad range of problems. At NJIT, Dr. Meegoda as PI has successfully concluded several multidisciplinary research projects with broader impact to the society. Some of those technologies are now extensively used while others are to be commercialized. He received the best practice paper award from the Environmental and Water Resources Institute of ASCE in May 2001 for the paper describing the results of one USEPA SITE demonstration project

Evaluation of the Performance of Permanent Pavement Markings: Some Implications for NJDOT

As an implementation strategy of the federal retroreflectivity standards requirement for pavement markings, New Jersey Department of Transportation (NJDOT) undertook to evaluate their three-year fixed-schedule re-striping strategy, to see if it was consistent with the actual service life of the pavement markings. The methodology and the results of the study conducted in 2001-2002 are presented, as well as some implications for future strategies. Two types of data were collected: measured retroreflectivity by LaserLux, and subjective ratings from a survey done by the New Jersey driving public along a 32 mile circuit. Interim Visibility Indices (IVI) were developed for each age group based on pavement marking type, for use by NJDOT in determining and prioritizing needs and quantification of related resources required, based on the threshold between acceptable retroreflectivity and unacceptable retroreflectivity, when developing their pavement marking management system. It is suggested that this will also allow for cost benefit/life cycle analysis for different pavement marking materials.

Presented by Dr. Neville A. Parker: Dr. Parker is a Herbert Kayser Professor of Civil Engineering and Director for the CUNY Institute for Transportation Systems. He is a 1965 graduate of the school and has been director of the institute since 1989. Professor Parker was among those selected recently by the Daily News as the top 25 African-American leaders in the fields of education, science and medicine in New York City

Partnership to Maximize Port Industry Performance

The freight and maritime transport industry is a complex system of private and government entities that are interdependent but lack established communication processes to leverage these interdependencies. This leads to a situation wherein stakeholders' attempts within the industry to optimize their individual operations lead to sub-optimal operating conditions and performance for the system as a whole. This project takes advantage of existing relationships between Rutgers University, Container Terminals, State and Local Highway Agencies, freight, and technology companies and members of the Port of New York & New Jersey (PONYNJ) to create a forum for a dynamic and sustainable collaboration between the maritime industry and the wider research community. The primary objectives of this collaborative project are the improvement of freight movements, reduction of traffic congestion, an increase in the competitiveness of the Port and, thereby, improvement of the overall regional economy.

Presented by Dr. Maria Boile: Maria Boilé received her B.S. in Civil Engineering from the National Technical University of Athens, Greece, in 1990; her M.S. in Civil Engineering from Rutgers University in 1992; and her Ph.D. in Transportation Engineering from the New Jersey Institute of Technology in 1995. She is an Assistant Professor in the Department of Civil and Environmental Engineering since 2000 and Director of Research and Education of the Maritime Infrastructure Engineering and Management Program (MIEMP). Before joining Rutgers University she was an Assistant Professor at Lafayette College in Easton, Pennsylvania since 1995. Her research interests include analysis, planning and operations of intermodal passenger and freight transportation systems, network modeling and optimization, maritime transportation, port operations, and transit network planning and design. Her research has been sponsored by the NSF, USDOT, FHWA, AAAS, NJDOT, PennDOT, Center for Advanced Infrastructure and Transportation, National Center for Transportation and Industrial Productivity, and the AT&T Foundation. She is a PI on a recent Academic Excellence Award for the establishment of a Freight Center of Excellence at Rutgers University.

Energy Absorbing Bridge Pier Fender Systems: A Survey and Recommendations

An overview of the results of a survey of energy absorbing bridge pier fender systems is presented. The survey had the following objectives: 1) identify existing technology which has been used for bridge fender protective systems by other states or countries; 2) identify state-of-the-art systems that are of the energy absorbing/impact deflecting variety, and that are either currently in use or commercial scale; and 3) rate the designs based on cost benefit criteria from best to worst. The existing technologies were identified and grouped into six main system categories, as follows: 1) pile supported; 2) retractable; 3) rubber; 4) gravity; 5) hydraulic; and 6) floating, with their advantages and disadvantages listed. Three state-of-the-art systems currently in use were identified, as follows: 1) cellular sheet pile dolphin and fenders; 2) donut monopile fenders; and 3) composite pile, fender and dolphin. The survey also studied the impacts of major ship collisions with bridges, in terms of bridge and vessel/barge damage, loss of life, and the environment, noting the fender system characteristics associated with the collisions. Based on these observations, and on the costs associated with recovery, it was recommended that a pier protection system composed of "hardcore composite pile dolphins, composite tubular piles with stay-in-place formwork surrounded by composite ultra high molecular weight fender panels", be adopted as the most cost-effective state-of-the-art system, with the lowest life-cycle costs. A schematic of the recommended system is also presented.

Presented by Dr. Neville A. Parker: Dr. Parker is a Herbert Kayser Professor of Civil Engineering and Director for the CUNY Institute for Transportation Systems. He is a 1965 graduate of the school and has been director of the institute since 1989. Professor Parker was among those selected recently by the Daily News as the top 25 African-American leaders in the fields of education, science and medicine in New York City.

Evaluation and Modeling of Repeated Load Test Data of Asphalt Concrete for Mechanistic-Empirical Pavement Design

The Mechanistic-Empirical Pavement Design Guide (MEPDG) made available by the National Cooperative Highway Research Program (NCHRP) in 2004 uses a power model that incorporates Dynamic Modulus (DM) as a factor in predicting rutting performance of asphalt concrete. The rutting model is empirical and the rutting profiles obtained from the model are based largely on the adjustment of calibration constants not the Dynamic Modulus. Various DM values would be capable of producing similar rutting profiles based on the current model. This study evaluates using accumulated strain data obtained from the Repeated Load Test (RLT) as an alternative to using DM. In addition, a model to represent the accumulated strain data obtained from the RLT is developed. The accuracy and behavior of the current model and the model developed in this study in representing a mix from Louisiana are compared. Alternatives for incorporating the RLT data into the MEPDG are also presented.

Presented by Dr. Yusuf Mehta: Dr. Yusuf Mehta is an Associate Professor of Civil and Environmental Engineering at Rowan University. Dr. Mehta has extensive experience on several research projects in association with Florida, Wisconsin and Rhode Island Departments of Transportations and Federal Highway Administration. Dr, Mehta has several publications in the flexible pavement materials, design and rehabilitation. Dr. Mehta received his Ph.D. in Civil Engineering from The Pennsylvania State University in 1999. He has worked in the field of pavement design and materials characterization for ten years. He has published in leading refereed journals and conference proceedings.

Flexible Overlays for Mitigating Reflective Cracking

Although reflective cracking significantly shortens the pavement service life, there is a lack of a performance-based HMA mixture design specification for routine use to develop HMA mixtures for use as flexible overlays for rigid pavements. Furthermore, neither the NCHRP 1-37A (Mechanistic-Empirical Pavement Design Guide) nor NCHRP 9-17 (Superpave Support and Models Management) specially address laboratory tests or mixture design procedures for the evaluation of reflective cracking, although the recently initiated NCHRP 1-41 (Models for Predicting Reflective Cracking of Hot Mix Asphalt Overlays) led by the Texas Transportation Institute (TTI) will try to provide guidance on these issues. Therefore, there is an urgent need to develop a performance-based HMA mixture design specification for different HMA mixtures for New Jersey, as well as evaluate and characterize new HMA mixtures and additives, to aid in resisting/prolonging the on-set of reflective cracking.

The research study is utilizing information from literature searches, surveys, finite element modeling, and extensive field and laboratory testing to develop guidelines for use in the HMA overlay design of composite/PCC pavements. A "Decision Tree" system that will utilize field forensic testing, as built information, and traffic, is being developed, which will aid the NJDOT is designing longer life HMA overlays for rigid pavements.

Presented by Tom Bennert: Thomas Bennert is the supervisor of the Rutgers University Asphalt Pavement Laboratory (RAPL) and a Senior Researcher for the Center of Advanced Infrastructure and Transportation (CAIT) at Rutgers University. He is also the instructor for Mechanistic Pavement Design, a graduate level course at Rutgers University. His research interests include: advanced material characterization of hot mix asphalt and unbound materials for pavement design, reflective cracking in flexible pavements, pavement-generated noise measurements, and use of recycled materials for transportation-related applications.

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NOTES: